**IEEE P802.15**

**Wireless Personal Area Networks**

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| Source | Trang Nguyen, and Yeong Min Jang (Kookmin University) |
| Re: | D4 comments and resolutions |
| Abstract | OCC PHY PIB attributes- table separation |
| Purpose | D4 comments and resolution |
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# #1: PHY PIB attributes update

## **Table 125—PHY PIB attributes**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Attribute** | **Ident.** | **Type** | **Range** | **Description** |
| *phyCurrentChannel* | 0x00 |  |  | Existing in 2011 std. |
| *phyCCAMode* | 0x01 |  |  | Existing in 2011 std. |
| *phyDim* | 0x02 |  |  | Existing in 2011 std. |
| *phyUseExtendedMode* | 0x03 |  |  | Existing in 2011 std. |
| *phyColorFunction* | 0x04 |  |  | Existing in 2011 std. |
| *phyBlinkingNotification-*  *Frequency* | 0x05 |  |  | Existing in 2011 std. |
| phyOccEnable | 0x06 | Boolean | 0/1 | This attribute enables the PHY modes for OCC.  0: PHY I, II, and III  1: PHY IV, V, and VI. |
| phyOccMcsID | 0x07 | Int. | 0-15 | This attribute identifies the OCC modulation when phyOccEnable =1. The proper values for the modulation and coding identification of OCC modes are described in table 126 (new). |

## **Table 126 (new): OCC PHY modes identification**

|  |  |
| --- | --- |
| **phyOccMcsID** | **PHY OCC mode Description** |
| 0 | UFSOOK |
| 1 | Twinkle VPPM |
| 2 | S2-PSK |
| 3 | HS-PSK |
| 4 | Offset-VPPM |
| 5 | RS-FSK |
| 6 | CM-FSK |
| 7 | C-OOK |
| 8 | MPM |
| 9 | A-QL |
| 10 | HA-QL |
| 11 | VTASC |
| 12 | IDE |
| 13-15 | Reserved |

## **Table 127 (new): PHY PIB attributes for UFSOOK mode**

## **Table 128 (new): PHY PIB attributes for Twinkle mode**

## **Table 129 (new): PHY PIB attributes for S2-PSK mode**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Attribute** | **Ident.** | **Type** | **Range** | **Description** |
| phyS2pskOpticalClockRate | - | Int. | 0-15 | The optical clock rate (or symbol rate) applied for S2-PSK.  0: 5 Hz  1: 10 Hz  2: 15 Hz  Others: Reserved |
| phyS2pskLineCode | - | Int. | 0-7 | This specifies the line coding for S2-PSK.  0: None  1: half rate line coding  Others: Reserved |
| phyS2pskFec | - | Int. | 0-7 | This attribute specifies FEC for S2-PSK.  0: None  1: RS(15,11)  Other values: Reserved |
| phyS2pskNumLightSources | - | Int. | 0-3 | The number of light sources used to modulate S2-PSK signal.  0: two light sources  1-3: Reserved |
| phyS2pskModulationRate | - | Int. | 0-7 | This attribute specifies the modulation frequency used for S2-PSK.  0: 200 Hz  1: 1000 Hz  2-7: Reserved |
| phyS2pskPsduLength | - | Int. | 0-255 | This is to specify the length PSDU in byte. |

## **Table 130 (new): PHY PIB attributes for HS-PSK mode**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Attribute** | **Ident.** | **Type** | **Range** | **Description** |
| phyHspskOpticalClockRate | - | Int. | 0-15 | The optical clock rate (or symbol rate) applied for HS-PSK.  0: 10 kHz  1: 50 kHz  others: Reserved |
| phyHspskLineCode | - | Int. | 0-7 | This specifies the line coding for HS-PSK  0: None  1: half-rate code for S2-PSK and none for DS8-PSK  Other values: Reserved |
| phyHspskFec | - | Int. | 0-7 | This attribute specifies FEC for HS-PSK modulation.  0: None for both S2-PSK and DS8-PSK  1: None for S2-PSK and RS (15, 11) for DS8-PSK  2: RS (15,11) for S2-PSK and RS (15, 7) for DS8-PSK  Other values: Reserved |
| phyHSpskNumLightSources | - | Int. | 0-7 | The number of light sources used to modulate HS-PSK signal.  0: two light sources, each consists of 8 LEDs.  1-7: Reserved |
| phyHSpskHighStreamMode | - | Int. | 0-7 | The modulation of high data stream.  0: DS8-PSK mode  1-7: Reserved |
| phyHSpskModulationRate | - | Int. | 0-7 | This attribute specifies the modulation frequency used for S2-PSK and DSM-PSK of HS-PSK.  0: 200Hz for S2-PSK and 80 kHz for DS8-PSK  1: 1 kHz for S2-PSK and 400 kHz for DS8-PSK  2-7: Reserved |
| phyHSpskLowDim | - | Int. | 0-500 | This attribute specifies the low dimming level of DS8-PSK |
| phyHSpskHighDim | - | Int. | 500-1000 | This attribute specifies the high dimming level of DS8-PSK |
| phyHSpskPsduLength | - | Int. | 0-255 | This is to specify the length in byte of the high-speed link of HS-PSK. |

## **Table 131 (new): PHY PIB attributes for Offset-VPPM mode**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Attribute** | **Ident** | **Type** | **Range** | **Description** |
| phySMFlashLIGHTApplicationSpecificMode | 0x10 | Unsigned | 0~255 | This attribute specifies the application specific PHY mode.  0 : Normal Data (Media Content, Information Content based on the Application used)  1 : ID Data  2 : Authentication Data |
| phyOffsetVPWMStdPERIOD | 0x11 | Integer | 0-65535 | This attribute specify the standard PWM period used to transmit the data (in micro secs) |
| phyOffsetVPWMOffsetPERIOD | 0x12 | Integer | 0-65535 | This attribute specify the Variable offset PWM period used to transmit the data (in micro secs) |

## **Table 132 (new): PHY PIB attributes for NS-FSK mode**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Attribute** | **Ident.** | **Type** | **Range** | **Description** |
| phyNsfskOpticalClockRate | - | Int. | 0-15 | The optical clock rate (or symbol rate) applied for RS-FSK. |
| phyNsfskFec | - | Int. | 0-7 | This attribute specifies FEC for NS-FSK modulation  0: XOR FEC  Other values: Reserved |
| phyNsfskNumFrequency |  | Int | 0-3 | This attribute specifies the number of frequencies used to modulate data in NS-FSK.  0: NS-FSK-C8  1: NS-FSK-C16  2-3: Reserved |
| phyNsfskInvFrequencyGap |  | int | 0-3 | Indicates the frequency differences between the frequency sets. This is represented by the inverse of frequency gap. i.e. the time difference in seconds.  0: 3.75e-4  1-2: Reserved  3: Use the value specified in phyOccCustomOpticalClockRate |
| phyNsfskCustomInvFrequencyGap |  | float |  | Custom inverse frequency gap, used when phyNsfskInvFrequencyGap = 3 |
| phyNsfskGroupCount |  | int | 0-7 | Indicates the maximum sequence number. i.e., how many frequency sets exist.  N: n+1 frequency set |
| phyNsfskFEC |  | int | 0-7 | Indicates the number of data symbols protected by one XOR FEC symbol.  N: n+1 symbols |
| phyNsfskSplitterSymbolEnable |  | boolean | T/F | Indicates whether the device uses SSs or not. |
| phyNsfskSplitterFrequency |  | int | 0-3 | Indicates the splitter frequency. This is represented as a ratio of the splitter frequency to the preamble frequency. If the SS is already in used, it will use the original phyNsfskSplitterFrequency until next cycle.  0: 1.4  1-2: Reserved  3: Custom |
| phyNsfskCustomSplitterFrequency |  | float |  | Custom splitter frequency, used when phyNsfskSplitterFrequency = 3­ |
| phyNsfskSplitterDuration |  | int | 0-7 | Indicates the duration of the SS. This is represented as a ratio of symbol duration to splitter duration in integer.  0: 15  1: 30  2: 60  3: 120  4-7: Reserved |
| phyNsfskSymbolDurationExp |  | int | 0-7 | Indicates the duration of a data symbol in the PSDU. This is represented as a ratio of the symbol duration to 1/30 second in the base 2 exponentiation. For example, if the symbol duration is 1/120 second, then the exponent would be -2. Note that this does not affect the duration of the preamble field and the optional field.  0: 0  1: 1  2: 2  3: -1  4: -2  5-6: Reserved  7; Custom |
| phyNsfskEndSymbolEnable |  | boolean | T/F | Indicates whether the device uses end symbol or not. |

## **Table 133 (new): PHY PIB attributes for CM-FSK mode**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Attribute** | **Ident.** | **Type** | **Range** | **Description** |
| phyCmfskOpticalClockRate | - | Int. | 0-15 | The optical clock rate (or symbol rate) applied for CM-FSK  0: 5 Hz  1: 10 Hz  2: 15 Hz  Others: Reserved |
| phyCmfskFec | - | Int. | 0-7 | This attribute specifies FEC for CM-FSK modulation.  0: None  1: RS(15,11) as an outer FEC.  Other values: Reserved |
| phyCmfskAb | - | Int. | 0-1 | This attribute specifies the number of asynchronous bits (Ab) used to insert to the pack of data bits in prior to mapping a frequency in CM-FSK.  0: 1 Ab is used to support the asynchronous communication  1: 2 Ab(s) is used to support the detection of missing symbols during reception. |
| phyCmfskNumFrequency | - | Int. | 0-3 | This attribute specifies the number of frequencies used to modulate data in CM-FSK.  0: 32-FSK  1: 64-FSK  2-3: Reserved |
| phyCmfskFrequencySeparation | - | Int. | 0-7 | This attribute specifies the frequency separation in CM-FSK.  0: 50 Hz  1: 100 Hz  2-7: Reserved |
| phyCmfskNumPhase | - | Int. | 0-3 | This attribute specifies the number of phases used to modulate data in CM-FSK.  0: None  1: 2-PSK  2-3: Reserved |
| phyCmfskPreamble | - | Int. | 0-7 | This attribute specifies the frequency value of the first preamble (fSF) in CM-FSK.  0: 200Hz  1-7: Reserved |
| phyCmfskSplitterEnable | - | Boolean | T/F | This attribute enables whether the splitter usage in between frequency symbols in CM-FSK. If the splitter is used between two frequency symbols, the duration of the splitter symbol is equal to the duration of data frequency symbol.  FALSE: Disable (Default)  TRUE: Enable |
| phyCmfskPsduLength | - | Int. | 0-255 | This is to specify the length of PSDU in byte. |

## **Table 134 (new): PHY PIB attributes for C-OOK mode**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Attribute** | **Ident.** | **Type** | **Range** | **Description** |
| phyCookOpticalClockRate | - | Int. | 0-15 | The optical clock rate (or symbol rate) applied for C-OOK  0: 2.2 kHz  1: 4.4 kHz  Others: Reserved |
| phyCookRLLCode | - | Int. | 0-7 | This specifies the RLL coding for C-OOK modulation, the RLL coding options include  0: Manchester  1: 4B6B coding  Other values: Reserved |
| phyCookFec | - | Int. | 0-7 | This attribute specifies FEC for C-OOK modulation,  0: None  1: Inner FEC: Hamming (8/4)  2: Inner FEC: Hamming (15/11)  3: Inner FEC: Hamming (8/4), outer FEC: RS(15,11)  4: Inner FEC: Hamming (15/11), outer FEC: RS(15,11)  Other values: Reserved |
| phyCookSubPacketRate | - | Int. | 0-7 | This attribute specifies the Data Sub-packet rate (denoted as DS rate) of C-OOK.  0: 60 sub-packet/sec  1: 100 sub-packet/sec  2-7: Reserved |
| phyCookPacketRate | - | Int. | 0-7 | This attribute specifies the Data Packet rate of C-OOK.  0: 5 packet/sec  1: 10 packet/sec  2: 15 packet/sec  3-7: Reserved |
| phyCookPreambleSymbol | - | Int. | 0-7 | This attribute specifies the preamble symbol of PSDU of C-OOK.  0: 6B symbol (preamble =011100)  1: 10B symbol (preamble =0011111000)  2-3: Reserved |
| phyCookAb | - | Int. | 0-3 | This attribute specifies the amount of Asynchronous bit (Ab) per data sub-frame of C-OOK.  0: 1 bit  1: 2 bit  2-3: Reserved |
| phyCookPsduLength | - | Int. | 0-255 | This is to specify the length of PSDU in byte. |

## **Table 135 (new): PHY PIB attributes for MPM mode**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Attribute** | **Iden.** | **Type** | **Range** | **Description** |
| *phyMpmMode* |  | Integer | 0-1 | Indicates the MPM PHY mode.  0: PWM mode  1: PPM mode |
| *phyMpmSequenceNumberLength* |  | Integer | 0x0-0xf | Indicates the bit-length of the Sequence Number subfield. |
| *phyMpmDynamicSequenceNumberLength* |  | Integer | 0-1 | Indicates the bit-length of the Sequence Number subfield is  0 : constant length  1 : variable length |
| *phyMpmPlcpHeaderSymbol* |  | Integer | 0x00-0xff | Indicates the base symbol value of the PLCP Header subfield. It is referred as *a*. |
| *phyMpmPlcpCenterSymbol* |  | Integer | 0x00-0xff | Indicates the base symbol value of the PLCP Center subfield. It is referred as *b*. |
| *phyMpmPlcpFooterSymbol* |  | Integer | 0x00-0xff | Indicates the base symbol value of the PLCP Footer subfield. It is referred as *c*. |
| *phyMpmSymbolSize* |  | Integer | 0x00-0xff | Indicates the number of symbols of the Payload subfield. 0x0 indicates variable. It is referred as *N*. |
| *phyMpmOddSymbolBit* |  | Integer | 0x0-0xf | Indicates the bit-length that is contained in each odd-numbered symbol of the Payload subfield. It is referred as *Modd*. |
| *phyMpmEvenSymbolBit* |  | Integer | 0x0-0xf | Indicates the bit-length that is contained in each even-numbered symbol of the Payload subfield. It is referred as *Meven*. |
| *phyMpmSymbolOffset* |  | Integer | 0x00-0xff | Indicates the offset value of symbols of the Payload subfield. It is referred as *W1*. |
| *phyMpmSymbolUnit* |  | Integer | 0x00-0xff | Indicates the unit value of symbols of the Payload subfield. It is referred as *W2*. |

## **Table 136 (new): PHY PIB attributes for A-QL mode**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Attribute** | **Ident.** | **Type** | **Range** | **Description** |
| phyAqlOpticalClockRate | - | Int. | 0-15 | The optical clock rate (or symbol rate) applied for A-QL mode.  0: 5 Hz  1: 10 Hz  2: 15 Hz  Others: Reserved |
| phyAqlFec | - | Int. | 0-7 | This attribute specifies FEC in case of A-QL modulation,  0: None  1: CC(1/4) as inner FEC  2: CC(1/3) as inner FEC; RS(15,11) as outer FEC  3: CC(1/4) as inner FEC; RS(15,7) as outer FEC  Other values: Reserved |
| phyAqlNumCells | - | Int. | 0-7 | The number of individual cells on Tx in A-QL mode.  0: 16x16 cells  1-7: Reserved |
| phyAqlCellSize | - | Int. | 0-1000 | This attribute specifies the size of cells (in pixels) to generate the A-QL code. |
| phyAqlBolderSize | - | float | 0-2 | This attributes specifies the ratio between the size of the bolder and the size of the cell. |
| phyAqlNumCellReference | - | Int. | 0-3 | The number of cells per each of four reference corners in A-QL mode.  0: 1 cell reference  1: 2x2 cell reference  2-3: Reserved |
| phyAqlColorSelection | - | Int. | 0-15 | The selection of color bands used in A-QL mode.  0: Grey mapping  1-9: valid combination of colors available in table 107-Valid color band combinations for CSK. |
| phyAqlPsduLength | - | Int. | 0-255 | This is to specify the length of PSDU in byte. |

## **Table 137 (new): PHY PIB attributes for HA-QL mode**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Attribute** | **Ident.** | **Type** | **Range** | **Description** |
| phyHAqlOpticalClockRate | - | Int. | 0-15 | The optical clock rate (or symbol rate) applied for HA-QL  0: 5 Hz  1: 10 Hz  2: 15 Hz  Others: Reserved |
| phyHAqlLineCode |  | Int | 0-7 | In case of HA-QL modulation, the RLL coding is  0: None  1: half-rate code  Others: Reserved |
| phyHAqlFec | - | Int. | 0-7 | This attribute specifies FEC for HA-QL modulation,  0: None  1: CC(1/3) as inner FEC; RS(15,11) as outer FEC  2: CC(1/4) as inner FEC; RS(15,7) as outer FEC  Other values: Reserved |
| phyHAqlNumCells | - | Int. | 0-7 | The number of individual cells on Tx in HA-QL mode.  0: 8x8 cells  1: 16x16 cells  2-7: Reserved |
| phyHAqlNumCellReference | - | Int. | 0-3 | The number of cells per each of four reference corners in HA-QL mode.  0: 1 cell reference  1: 2x2 cell reference  2-3: Reserved |
| phyHAqlAb |  | int | 0-7 | This attributes specifies the number of Ab bits embedded into a block of data to be carried by a HA-QL code. |
| phyHAqlIntensity | - | float | 0-1 | This specifies the intensity level of the modulated intensity. 0 means the intensity of the original image does not change; and 1 means the intensity of the original image is inversed. |
| phyHAqlPsduLength | - | Int. | 0-255 | This is to specify the length of PSDU in byte. |

## **Table 138 (new): PHY PIB attributes for VTASC mode**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Attribute** | **Ident** | **Type** | **Range** | **Description** |
| phyVTASCTxMode | 0x10 | Unsigned | 0-255 | This attribute indicates the VTASC PHY transmission modes.  0 : VTASC Mode  1 : SS VTASC Mode |
| phyVTASCApplicationSpecificMode | 0x10 | Unsigned | 0~255 | This attribute specifies the application specific PHY mode.  0 : Normal Data (Media Content, Information Content based on the Application used for)  1 : LED ID Data  2 : Authentication Data |
| phyVTASCTxCameraEnable | 0x92 | Unsigned | 0-255 | This attribute indicates the Transmitter is Enabled with Camera or not for Interactive Receiver distance specific data transfer control.  0 : Camera not connected  1 : Camera connected |
| phyVTASCRxDistance | 0x93 | Unsigned | 0-255 | This attribute notify the Receiver distance from Transmitter |
| PhyVTASCFreq | 0x11 | Unsigned | 0~255 | This attribute specify the frame rate of VTASC sequence Transmission |
| phyVTASCCodeArea | 0x12 | Unsigned | 0~255 | This attribute specify the coded area of the IDE  0 : Full Screen  1 : Partial Screen  2~255 : Reserved |
| phyVTASCCodeLocation | 0x13 | Unsigned | 0~255 | This attribute specify the Coded Location of the VTASC  0 : Center  1 : Bottom Right  2 : Bottom Left  3 : Top Right  4 : Top Left  5~255 : Reserved |
| phyVTASCTLevel | 0x14 | Unsigned | 0~255 | This attribute specify the transparency Level of the VTASC  0 : One Level (100 % transparency)  1 : Two Level (100 % & 50 % transparency)  2~255 : Reserved |
| phyVTASCALevel | 0x14 | Unsigned | 0~255 | This attribute specify the block size of the VTASC  0 : One Level  1 : Two Level  2 : Three Level  3 : Four Level  4~255 : Reserved |
| phyVTASCSLevel | 0x14 | Unsigned | 0~255 | This attribute specify the number of shapes used in the VTASC  0 : One Shape  1 : Two Shapes  2: Three Shapes  3 : Four Shapes  4~255 : Reserved |
| phyVTASCCLevel | 0x14 | Unsigned | 0~255 | This attribute specify the number of colors used in the VTASC  0 : One color  1 : Two colors  2 : Three colors  3 : Four colors  4 : Five colors  5 : Six colors  6 : Seven colors  7 : Eight colors  4~255 : Reserved |
| phyVTASCSModel | 0x17 | Unsigned | 0~255 | This attribute specify the block shape Type used in the VTASC  0 : Square  1 : Circle  3 : hexagon  4 : star  5~65535 : Reserved |
| phyVTASCAHSize | 0x15 | Unsigned | 0~255 | This attribute specify the no of Horizontal Blocks in the VTASC |
| phyVTASCAVSize | 0x16 | Unsigned | 0~255 | This attribute specify the no of Vertical Blocks in the VTASC |
| phyVTASCScalRateCtrl | 0x18 | Unsigned | 0~255 | This attribute specify the Scalable Rate control mode  0 : No Scalable Bitrate control  1 : Multirate Scalable Controller  2: Distance Adaptive Scalable Controller  3: Distance adaptive with multirate scalable controller |
| phyVTACScalRegion1OpticalClockRate | 0x19 | Unsigned | 0~255 | This attribute specify the scalable optical clock rate of VTASC region 1 |
| phyVTACScalRegion2OpticalClockRate | 0x1A | Unsigned | 0~255 | This attribute specify the scalable optical clock rate of VTASC region 2 |
| phyVTACScalRegion3OpticalClockRate | 0x1B | Unsigned | 0~255 | This attribute specify the scalable optical clock rate of VTASC region 3 |
| phyVTACScalRegion4OpticalClockRate | 0x1C | Unsigned | 0~255 | This attribute specify the scalable optical clock rate of VTASC region4 |
| phyVTACScalRegion1DistanceRange | 0x19 | Unsigned | 0~255 | This attribute specify the distance adapted on VTASC region 1 |
| phyVTACScalRegion2DistanceRange | 0x1A | Unsigned | 0~255 | This attribute specify the distance adapted on VTASC region 2 |
| phyVTACScalRegion3DistanceRange | 0x1B | Unsigned | 0~255 | This attribute specify the distance adapted on VTASC region 3 |
| phyVTACScalRegion4DistanceRange | 0x1C | Unsigned | 0~255 | This attribute specify the distance adapted on VTASC region 4 |
| PhySSCode1Len | 0x1D | Unsigned | 0~255 | This attribute specify the spreading code length for SS Code 1 |
| PhySSCode2Len | 0x1E | Unsigned | 0~255 | This attribute specify the spreading code length for SS Code 2 |
| PhySSCode3Len | 0x1F | Unsigned | 0~255 | This attribute specify the spreading code length for SS Code 3 |
| PhySSCode4Len | 0x20 | Unsigned | 0~255 | This attribute specify the spreading code length for SS Code 4 |
| PhySSCode1FP00 | 0x21 | Integer | 0~65535 | This attribute specify the SS Code 1 pair code 0 |
| PhySSCode1FP01 | 0x22 | Integer | 0~65535 | This attribute specify the SS Code 1 pair code 1 |
| PhySSCode2FP00 | 0x23 | Integer | 0~65535 | This attribute specify the SS Code 2 pair code 0 |
| PhySSCode2FP01 | 0x24 | Integer | 0~65535 | This attribute specify the SS Code 2 pair code 1 |
| PhySSCode3FP00 | 0x25 | Integer | 0~65535 | This attribute specify the SS Code 3 pair code 0 |
| PhySSCode3FP01 | 0x26 | Integer | 0~65535 | This attribute specify the SS Code 3 pair code 1 |
| PhySSCode4FP00 | 0x27 | Integer | 0~65535 | This attribute specify the SS Code 4 pair code 0 |
| PhySSCode4FP01 | 0x28 | Integer | 0~65535 | This attribute specify the SS Code 4 pair code 1 |
| phyVTASCCValue | 0x29 | Unsigned | 0~255 | This attribute specify the no of Colors used in the VTASC |
| phyVTASCTxHSize | 0x3A | Integer | 0-65535 | This attribute specify the no of Horizontal Pixel in the 2D Display Transmitter |
| phyVTASCTxVSize | 0x3B | Integer | 0-65535 | This attribute specify the no of Vertical Pixel in the 2D Display Transmitter |

## **Table 139 (new): PHY PIB attributes for IDE mode**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Attribute** | **Ident** | **Type** | **Range** | **Description** |
| phyIDETxMode | 0x10 | Unsigned | 0-255 | This attribute indicates the Invisible Data Embedding transmission modes.  0 : IDE-BLENDING  1 : IDE-WATERMARK  2 : SS IDE-BLEND  3 : SS IDE-WATERMARK |
| phyIDEApplicationSpecificMode | 0x11 | Unsigned | 0~255 | This attribute specifies the application specific PHY mode.  0 : Normal Data (Media Content, Information Content based on the Application used for)  1 : ID Data  2 : Authentication Data  3~255: Reserved |
| phyIDETxCamerEnable | 0x12 | Unsigned | 0-255 | This attribute indicates the Transmitter is Enabled with Camera or not for Interactive Receiver distance specific data transfer control.  0 : Camera not connected  1 : Camera connected |
| phyIDERxDistance | 0x13 | Unsigned | 0-255 | This attribute notify the Receiver distance from Transmitter |
| phyIDEModulation | 0x14 | Unsigned | 0~255 | This attribute specifies the modulation.  0 : M-FSK  1 : HYBRID-MPFSK  2 : 2D Binary Code  3~255: Reserved |
| phyIDENoFrequency | 0x15 | Unsigned | 0~255 | This attribute specifies the number of frequency used in M-FSK and Hybrid-MPFSK |
| phyIDENoPhase | 0x16 | Unsigned | 0~255 | This attribute specifies the number of phase used in Hybrid-MPFSK |
| phyIDEFreqBase | 0x15 | Unsigned | 0~255 | This attribute specifies the base frequency used in M-FSK and Hybrid-MPFSK |
| phyIDEFreqSeparation | 0x16 | Unsigned | 0~255 | This attribute specifies the frequency difference used in M-FSK and Hybrid-MPFSK |
| phyIDEPhaseBase | 0x15 | Unsigned | 0~255 | This attribute specifies the base Phase used in Hybrid-MPFSK |
| phyIDEPhaseSeparation | 0x16 | Unsigned | 0~255 | This attribute specifies the Phase difference used in Hybrid-MPFSK |
| phyIDECodedArea | 0x17 | Unsigned | 0~255 | This attribute specify the coded area of the IDE  0 : Full Screen  1 : Partial Screen  2~255 : Reserved |
| phyIDECodedLocation | 0x18 | Unsigned | 0~255 | This attribute specify the Coded Location of the IDE  0 : Center  1 : Bottom Right  2 : Bottom Left  3 : Top Right  4 : Top Left  5~255 : Reserved |
| phyIDEHSize | 0x19 | Integer | 0-65535 | This attribute specify the no of horizontal pixel in the display |
| phyIDEVSize | 0x1A | Integer | 0-65535 | This attribute specify the no of vertical Pixel in the display |
| phyIDEENCHozAreaSize | 0x1B | Integer | 0-65535 | This attribute specify the no of horizontal pixel area to Encode |
| phyIDEENCVerAreaSize | 0x1C | Integer | 0-65535 | This attribute specify the no of horizontal pixel area to Encode |
| phyIDEMxNBlockSize | 0x1D | Unsigned | 0~255 | This attribute specify the no of Horizontal pixels in Blocks in the IDE  0 – 16x16 pixels  1 – 32x32 pixels  2 – 64x64 pixels  3~255: Reserved |
| phyIDEFrequency | 0x1E | Unsigned | 0~255 | This attribute specify the frame rate of IDE sequence Transmission |
| PhyIDETxHSize | 0x1F | Integer | 0-65535 | This attribute specify the no of Horizontal Pixel in the 2D Display Transmitter |
| PhyIDETxVSize | 0x20 | Integer | 0-65535 | This attribute specify the no of Vertical Pixel in the 2D Display Transmitter |